

layer. The result obtained in the case taken was in good agreement with the experimental data.

It must be borne in mind that, while the base of this layer seems always to be quite well marked, its temperature varies by as much as 20° C. in a day or two and the altitude at which it is found by as much as 1,000 meters or about 2½ miles in the same time.

#### THE BALTIMORE MEETING OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS.

At the meeting of the Association of American Geographers held at Baltimore, Md., January 1 and 2, 1909, the following papers of interest to our readers were presented:

Mr. A. Lawrence Rotch spoke on the temperature at great heights above the American Continent.

Prof. R. DeC. Ward, on the cyclonic unit in climatological investigations, as follows:

Climatology has been too much concerned with monthly, seasonal, and annual averages. These summaries being based on final and definite periods, do not bring out the variations of the climatic elements under cyclonic and anticyclonic control, yet the irregular cyclonic and cyclonic changes are the very ones which most affect man. An important addition to the usual climatic summaries would be the introduction for all regions in which the cyclonic or storm control of weather conditions is characteristic, of the cyclonic unit, so that, for example, the average duration and value of cyclonic ranges of temperature in the several months, or the proportion of rain and snowfall received from cyclonic storms, or from local thunderstorms, might be determined.

Prof. Ellsworth Huntington on the climate of the historic past in the Americas, to appear in the next number of the *MONTHLY WEATHER REVIEW*.

Mr. Henry Gannett spoke on the climate of Cuba.

On December 31, 1908, Prof. Albrecht Penck of the University of Berlin, Kaiser Wilhelm Exchange Professor, gave a lecture on "The relation between climate, soil, and man," of which we hope to print an abstract in a later number.—*C. A., jr.*

#### NOTES FROM THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

JOSEPH MARIA PERNTER, 1848-1908.

We regret to report the death of the eminent Austrian physicist and meteorologist, Hofrat Prof. Dr. Josef Maria Pernter, on December 20, 1908, at Arco, after a long and painful illness. Professor Pernter was the director of the Austrian Central Institution for Meteorology and Geodynamics, Hohe Warte, Vienna; a member of the International Meteorological Committee, and Vice President of the Imperial Royal Austrian Society for Meteorology. He was born March 15, 1848, at Neumarkt, in the Tyrol, was educated at Innsbruck and Vienna, and has past most of his life in the service of the Austrian Central Institution for Meteorology, of which he became director in 1897, on the retirement of Hann. While his writings, published mostly as memoirs and notes in the scientific journals, have covered a wide range of meteorological subjects, his favorite field was atmospheric optics. In 1902 he began the publication of his "Meteorologische Optik," announcing that the work would be completed, in four parts, within a year. This expectation was unfortunately not realized, and but three parts, comprising 558 octavo pages, have been published to the present time. We are glad to learn, however, thru a private letter, that the completion of this important work, which is the only modern treatise covering the whole field of atmospheric optics, has been undertaken by Dr. Felix Exner, who was one of the late Professor Pernter's assistants at Vienna.

#### THE RAINFALL OF ITALY.<sup>1</sup>

It will be remembered that at the Paris meeting of the International Meteorological Committee, in 1907, special promi-

<sup>1</sup> Eredia, Filippo. Le precipitazioni atmosferiche in Italia dal 1880 al 1906. Roma, 1908. (Estratto dagli Annali dell'Ufficio Centrale Meteorologico e Geodinamico italiano, vol. 25, parte 1, 1905.)

nence was given to the question of compiling and publishing the data collected over a long period of years by the meteorological services of the world. A list of the publications of this character already issued or in contemplation was given in an appendix to the report of the meeting, and constitutes a bibliography of great value to meteorologists and climatologists.

Under the head of Italy it was announced that a compilation of the precipitation data embracing the period 1880-1905 was in preparation. This work, which has now appeared, is a folio volume of 315 pages, together with seventeen colored plates showing the normal monthly, seasonal, and yearly distribution of rainfall over the whole of Italy, including Sicily and Sardinia. The tables give for each of 215 stations the monthly amount of rainfall and frequency of rainy days (i. e., days with 0.1 millimeter or more) during every year of observation within the period stated. All of these stations have long records, almost or quite coextensive with the period under discussion, hence no reductions have been applied to render the series homogeneous as to time. Other features of the work are a description of the annual march of the amount and the frequency of precipitation, six types of each being distinguished, and a discussion of the influence of topography upon the amount of precipitation.

The author, Dr. Filippo Eredia, has taken great pains to correct doubtful figures by correspondence with the observers, and he states that the figures he gives are to be considered authoritative in the case of discrepancies between this and earlier publications. The principal object of the present work is to bring out the geographical distribution of the rainfall in Italy; another work, now in preparation, will present statistics covering a longer period of time and exhibit especially the variability of the rainfall.

#### WORLD-WIDE RELATIONS OF THE INDIAN MONSOON RAINFALL.

The Annual Report for 1906-7 of the Board of Scientific Advice for India discusses *inter alia* the researches lately made into the connection between meteorological conditions in various parts of the world in the period preceding the Indian monsoon, and the amount of rainfall therein to be expected. A study of the statistics at present available seems to show that the conditions most closely associated with abundant monsoon rains are: low pressure at Mauritius in the preceding May, deficient subequatorial rainfall in May as given by Zanzibar and the Seychelles, deficient snowfall in May, and high pressure in India during the previous year. A formula has been worked out for calculating the monsoon rainfall departures, and on applying this to successive years from 1875 onward it is found that of the years with a forecasted departure of more than one inch, the sign of the departure has been correctly estimated in twenty cases out of twenty-four. An important relationship seems to have been established between pressure at Mauritius and the position of the trough of low pressure in upper India in June, July, and August.

The report also refers to results of investigations of the upper air by means of kites. On July 17, 1907, the highest kite ascent yet made in India (12,000 feet) was effected at Belgaum with good results, but soon afterwards the conditions became prohibitive of further attempts. The dry layer which had sometimes been found to occur in 1906, at heights between 2,500 and 8,300 feet, was found only once in 1907 at a height of about 5,000 feet. Kite flying during the monsoon has proved more difficult than had been anticipated, and work with sounding balloons has also to encounter obstacles. It has shown, however, that tho there is always a large westerly component in the upper air current above Simla, it is not so constant either in direction or velocity as might have been imagined.—*Geographical Journal*, January, 1909.

#### BRITISH NATIONAL ANTARCTIC EXPEDITION, 1901-1904.

The Royal Society has published, in a substantial and handsome volume, the chief part of the results of the meteorologi-

cal observations of the British National Antarctic Expedition, commanded by Commander R. F. Scott, R. N., which left Cowes in August, 1901, and returned to Spithead in September, 1904.<sup>2</sup> This volume has been prepared under the superintendence of Doctor Shaw, Director of the Meteorological Office, with the cooperation of a committee of the Royal Society; and several eminent British meteorologists, official and otherwise, contribute to the discussion of the several kinds of observations. An extended review of this publication appears in *Nature* of December 17, 1908. The expedition has rendered a splendid service to meteorology in obtaining two years of continuous observations at a station far within the Antarctic Circle (lat. 77° 50' 50" S.).

Especially timely and interesting is Doctor Shaw's review of the question as to the existence of a permanent anticyclone over the South Polar Continent (p. x-xiv). This question remains unsettled.

#### AEROLOGICAL EXPEDITION TO EAST AFRICA.

Das Wetter announces that the aerological expedition of the Royal Aeronautical Observatory at Lindenberg, to the Victoria Nyanza and the coast of East Africa, fitted out at the expense of Messrs. W. Tepelmann, Brunswick (Friedr. Vieweg & Sohn); Prinzhorn, of the Continental Caoutchouc and Gutta Percha Company, Hanover; Arnhold, Berlin; and von Guillaume, Cologne, sailed in June under the conduct of Professor Berson, of Lindenberg, Doctor Elias, of Berlin, and balloon inspector Mund, of the aeronautical observatory. It was to have returned at the end of December, after having made a series of ascensions on Victoria Lake and on the east coast of Africa from Mombassa to Delagoa Bay, with kites, registering balloons, and pilot balloons—the latter up to a height of 22,000 meters. Most important data have been obtained on the monsoon winds and the processes in the upper layers of the atmosphere, in the interior of Africa, under the equator, and on the Indian Ocean.

#### TORNADOES IN ARKANSAS DURING NOVEMBER, 1908.

At 8 a. m. November 23, 1908, a small low of moderate intensity (pressure 29.65 inches at center) was central over the northwestern corner of Arkansas. Rain had recently fallen, or was falling, over the northern two-thirds of Kansas and over eastern Oklahoma, with thunderstorms at Little Rock, Ark., and Memphis, Tenn. Southerly and southeasterly winds prevailed over the States bordering the lower Mississippi on the west.

This low (No. 1) moved northeastward, rapidly increasing in intensity, and by 8 a. m. of the 24th its center was over Des Moines, Iowa, with a pressure of 29.35 inches, or lower. Simultaneously a second and almost equally intense low (No. 2) had developed over southeastern Utah, accompanied by snow in the southeastern quadrant. The whole Mississippi Valley was included in the rain area of the low No. 1, and a number of thunderstorms occurred in its southeastern quadrant.

By 8 a. m. of the 25th the low No. 2 had moved south-southeastward into Texas and then turned northeastward to a position central over Dodge City, Kans., with a pressure of 29.40 inches, while low No. 1 had moved northward but a short distance to Duluth, Minn. The whole country, except for the Atlantic and Gulf shores, was involved in rain, and a belt of thunderstorms reached from Dodge City, Kans., to Milwaukee, Wis.

#### *Tornadoes of November 23, 1908.*

The weather conditions outlined above proved particularly favorable for the development of tornadoes in Oklahoma, west-

ern Arkansas, and southern Missouri during the afternoon and evening of November 23, and again in eastern Arkansas on the afternoon of November 25. Except for local deflections due to local topographic features, the tornadoes travelled from the southwest to the northeast in all cases, as shown by the map, fig 1. There seem to have been two and perhaps three distinct periods of tornado development on the 23d.

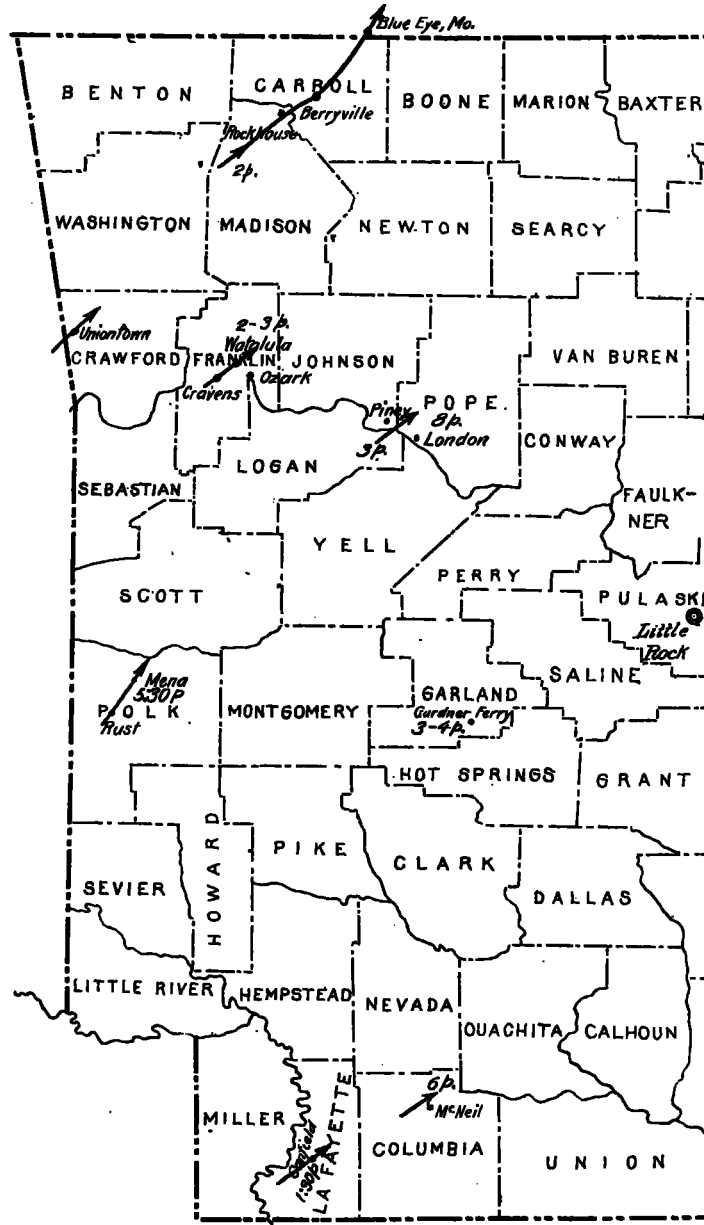


FIG. 1.—Tracks of tornadoes in western Arkansas November 23, 1908.

The earliest reported occurrences came between 1:30 and 2 p. m. Canfield, Lafayette County, Ark., was visited at 1:30 p. m. by a tornado moving from southwest to northeast, which destroyed \$1,500 of property, over a path about one-fourth mile wide, and injured four persons, none fatally. At about 2 p. m. a tornado passed 15 miles northwest of Huntsville, Madison County, Ark., traveling in the same general direction along a path one-fourth mile wide. It did much damage near Huntsville and slightly injured several persons. This same tornado evidently continued past Rock House into Carroll County, Ark., causing damage to the amount of \$50,000 in the vicinity of Berryville, Carroll County, which it reached at 2:15 p. m.; it past out of the State into Missouri at Blue Eye, Stone County, Mo., and there blew away a school house without injuring the

<sup>2</sup> National antarctic expedition, 1901-1904. Meteorology, part 1. Observations at winter quarters and on sledge journeys, with discussions by various authors. Prepared under the superintendence of the Director of the Meteorological Office with the cooperation of a committee of the Royal Society. London, 1908.